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ENTOMOLOGY.<sup>1</sup>

THE FRENCH STILL LOOKING TOWARD AMERICAN VINES.—The latest London papers bring information concerning the French Superior Commission on the Phylloxera, which lately held its final sitting under the presidency of the Minister of Agriculture and Commerce. The introduction of American stocks into the department of the Gironde was authorized. The commission then decided that no one had gained the £12,000 prize for an efficient remedy. The remedies approved by the commission continue to be, as before, submersion, sulphur of carbon and sulphocarbonate of potassium. They recommend further the continuance of State aid to those departments which are attempting the reconstitution of their vineyards by the aid of American descriptions. In certain departments this attempt has hitherto proved very successful. The nursery established at Saintes (Charente Inférieure) distributed last year 7000 roots and this year 30,000, and further anticipated providing double if not triple the last number next year, with the promised aid of Government.—*Pacific Rural Press*.

LEGISLATION TO CONTROL INSECTS INJURIOUS TO VEGETATION.—Professor C. H. Dwinelle, of the University of California, has been appointed by the California State Horticultural Society as a member of a committee to consider what legislation is desirable to check the spreading of noxious insects, and force land-owners to destroy them when practicable.

The committee has in mind a commission with power to investigate and abate nuisances in the way of neglected breeding grounds of insect pests, codling moth, scale insects, etc. They expect to be met by objections from the free American citizen, standing upon his constitutional right to do as he pleases with his own property, but they question his right to maintain an orchard which is unprofitable to himself and a pest in the neighborhood.

No laws have been passed in this country obliging the destruction of injurious insects, except in the case of the destructive locust of the West. These laws are given in the first report of the U. S. Entomological Commission on this insect. They have passed laws both in France and Germany to oblige the gathering of caterpillars, their eggs, etc., from fruit and shade trees. They also have in those countries many police regulations regarding the destruction of injurious insects and the prevention of injury to agriculture, forestry and horticulture. The local authorities have full power to rigidly enforce these laws and regulations, which, on the whole, do a great deal of good. The whole population of a district which is invaded by an insect enemy is, in case of emergency, at the command of the authorities, and what can

<sup>1</sup> This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

be accomplished by such concerted and well-directed action is shown by the heading off of the threatened invasion of the Colorado potato-beetle some years ago. Of course such laws could not be very well enforced in this country; but we see no objection to a committee of surveillance empowered to order the suppression of certain insects at any particular point where such are allowed to multiply unchecked, to the injury of the neighborhood. A penalty might be attached for the non-performance of work ordered by such committee, as in the case of all other laws requiring work for the common good. That intelligent suppression, in this manner, of many insects, such as scale-insects, Phylloxera, or even of fungus diseases, would be productive of much general good in preventing the spread of, or in decreasing, injury, there can be no question, and we sincerely hope that our California friends will succeed in their efforts to get such a law.—*C. V. R. in Farmers' Review.*

ON SOME INTERACTIONS OF ORGANISMS.—We have received an advance copy of a brochure with this title by Professor S. A. Forbes, extracted from Bulletin No. 3 of the Illinois State Laboratory of Natural History. It contains some thoughts and generalizations that have grown out of that writer's studies on the food of birds, insects and fishes, and the interrelation and interdependence of these animals. Professor Forbes finds that it is extremely unlikely that a species injurious to man's interest and well-being can ever be exterminated or even permanently lessened in numbers by a parasite strictly dependent upon it. This is a conclusion which greatly diminishes the importance of parasitism in the warfare by man against insects or other animals injurious to him, whether directly or indirectly. He rightly maintains that the interests of a species of plant or animal and the interests of its enemies "are identical, and since the operations of natural selection tend constantly to bring about an adjustment of the species and its enemies which shall best promote this common interest; therefore, *the annihilation of all the established 'enemies' of a species would, as a rule, have no effect to increase its final average numbers.* This being a general law, applying to all organisms, it is plain that the real and final limits of a species are the inorganic features of its environment,—soil, climate, seasonal peculiarities, and the like."

He contends that we get more protection against the inordinate increase of noxious insects, from predaceous birds and predaceous insects which eat a mixed food, because in the absence or diminution of any one element of their food their own numbers are not seriously affected, and, as a consequence, they are more generally ready, upon occasion, for effective attack on a threatening foe than any special parasite can be whose increase and decrease are more intimately dependent upon the increase and decrease of its prey. Reasoning from this standpoint the superiority of insectivorous birds becomes plainly manifest, their wing power en-

abling them to escape scarcity in one region which might otherwise decimate them, by simply passing to a more favorable region where they can find food. It does not follow, however, from these facts that the indefinite multiplication of either birds or insects is beneficial, since there is a limit beyond which such multiplication becomes harmful.

We recommend and heartily endorse the following concluding passages from the paper :

"We are therefore sure that the destruction of any species of insectivorous bird or predaceous insect is a thing to be done, if at all, only after the fullest acquaintance with the facts. The natural presumptions are nearly all in their favor. It is also certain that the species best worth preserving are the mixed feeders and not those of narrowly restricted dietary (parasites, for instance) —that while the destruction of the latter would cause injurious oscillations in the species affected by them, they afford a very uncertain safeguard against the *rise* of such oscillations. In fact, their undue increase would be finally as dangerous as their diminution. \* \* \*

"When we compare the results of the primitive natural order with the interests of man, we see that, with much coincidence, there is also considerable conflict. While the natural order is directed to the mere maintenance of the species, the necessities of man usually require much more. They require that the plant or animal should be urged to excessive and superfluous growth and increase, and that all the surplus, variously and widely distributed in nature, should now be appropriated to the supply of human wants. From the consequent human interferences with the established system of things, numerous disturbances arise, many of them full of danger, others fruitful of positive evil. Oscillations of species appear, not less injurious to man than to the plants and animals more directly involved. Indeed, most of the serious insect injuries, for example, are due to species whose injurious oscillations have resulted from changes of the organic balance initiated by man.

"To avoid or mitigate the evils likely to arise, and to adapt the life of his region more exactly to his purposes, man must study the natural order as a whole, and must understand the disturbances to which it has been subject. Especially, he must know the forces which tend to the reduction of these disturbances, and those which tend to perpetuate or aggravate them, in order that he may reinforce the first, and weaken or divest the second.

"The main lesson of conduct taught us by these facts and reasonings, is that of conservative action and exhaustive inquiry. Reasoning unwarranted by facts, not correctly and sufficiently reasoned out, are equally worthless and dangerous for practical use."

BARON de Chaudoir, of Russia, R. H. McLachlan, of England, and Baron C. R. Osten Sacken, formerly Russian Consul General

to this country, have been elected honorary members of the Belgian Entomological Society to fill the vacancies caused by the deaths of Boisduval, Mulsant and Snellen van Vollenhoven.

INSECT LOCOMOTION.—M. G. Carlet, of France, has been studying the locomotion of insects and arachnids, and reports as the result of his observations that the walking of insects may be represented by that of three men in Indian file, the foremost and hindmost of whom keep step with each other, while the middle one walks in the alternate step. The walking of arachnids is represented by four men in file, the even-numbered ones walking in one step, while the odd-numbered ones walk in the alternate step.

PLANT-FEEDING HABITS OF PREDACEOUS BEETLES.—In a recent letter Mr. V. T. Chambers suggests that when *Harpalus* has been recorded as feeding on the seeds of *Ambrosia artemisiæfolia* it may have been feeding on the larvæ of *Gelechia ambrosiæella* which lives in those seeds. In reply we would remark that during the past year the question of the herbivorous habits of certain predaceous beetles has been settled beyond all peradventure. Notices of such habit, always considered exceptional among Carabidæ or ground-beetles, appear in a number of European works, and *Zabrus gibbus* more particularly has been known to be quite destructive to grain.<sup>1</sup> Coleopterists have always been inclined to doubt the accuracy of these charges, and those who believe in the unity of habit in a given genus or family are also slow to accept statements that indicate exceptional habits. In Bulletin 3 of the Illinois State Laboratory of Natural History, Mr. F. M. Webster, of Waterman, Ill., who had previously communicated his experience with certain species of *Harpalus* and *Anisodactylus*, charging them with being particularly fond of the unripe seeds of some grasses,<sup>2</sup> has given a more detailed account of the herbivorous inclination of various Carabidæ and even of one species of Coccinellidæ (*Megilla maculata* DeGeer): His observations and actual detection of the insects partaking of such vegetable food cannot longer be questioned, as they are fully confirmed and supported in a valuable paper in the same Bulletin by Prof. Forbes, Director of the Laboratory, who, by a series of microscopic examinations of the stomachs of various predaceous beetles, has confirmed the observations of Mr. Webster and proven beyond question that, while the habit of the Carabidæ is in the main carnivorous, yet a large number of the species feed upon either the spores of different fungi, the pollen of flowers, or the seeds of grasses and grains. Out of twenty-eight specimens, representing seventeen species belonging to the genera *Galerita*, *Loxopeza*, *Calathus*, *Anisodactylus*, *Amara*, *Harpalus*, *Cratacanthus*, *Evarthrus*, *Pterostichus*, *Chlænus* and *Bradycellus*, twenty specimens belonging to eleven species had eaten vegetable

<sup>1</sup> See Curtis' "Farm Insects," p. 388.

<sup>2</sup> *Am. Ent.*, III, p. 26.

matter of some sort. In fact about one-half the food of these twenty-eight specimens consisted of vegetation, one-third of it being derived from Cryptogamia and the rest from grasses and Compositæ.

Still more startling, however, are the results of his examinations of different Coccinellidæ or ladybirds. *Coccinella novem-notata*, *Brachyacantha ursina*, *Hippodamia convergens* and *Megilla maculata* were all found to be extremely fond of the spores of fungi and some of them of the pollen of different Compositæ, the last named species in addition to fungus spores and pollen grains (probably those of the common dandelion), was proven to feed also upon the anthers and pollen of grasses. We have long been suspicious that this species was almost as thoroughly a vegetable feeder as the well-known northern squash-beetle (*Epilachna borealis*), which was always supposed to be the only exception to the carnivorous habits of its family.

In July, 1874, we received a number of specimens of this *Megilla* from Mr. Geo. B. P. Taylor, of St. Inigoes, Md., who reported them as having done considerable injury to corn by eating holes in the blades, and specimens of blades that were riddled and perforated accompanied the beetles. We have on one or two occasions since endeavored to test the vegetable-feeding habit of this insect in confinement, but without success, though it freely partook of the eggs of other insects, while we have known it to feed indiscriminately on the eggs, larvæ and pupæ of *Lina scripta*, or the streaked cottonwood-beetle.

Mr. Chambers' note refers to a communication by Mr. Wm. Trelease in the *American Entomologist*,<sup>1</sup> who found the common *Harpalus caliginosus* engaged in eating the contents of the partly-grown seed of the Rag-weed (*Ambrosia artemisiæfolia*), which observations were confirmed by Prof. W. A. Buckhout,<sup>2</sup> of the State College, Center Co., Penn., who believed that he had in addition found this beetle feeding upon the pollen of the staminate flowers of the same plant.

In accordance with his general conclusions indicated in a notice in the present number "On some Interactions of Organisms," Prof. Forbes believes that this partial herbivorous habit among the predaceous beetles renders them more valuable to man than they would be if confined solely to animal food. To use his own language: "As a prudent sovereign finds it worth while to maintain a much larger fighting force than is necessary to the ordinary administration of his government, in order that he may have always a reserve of power with which to meet aspiring rebellion, so it is to the general advantage that carnivorous insects should abound in larger numbers than could find sustenance in the ordinary surplus of insect reproduction. They will then be prepared to

<sup>1</sup> Vol. III, p. 251.

<sup>2</sup> Ibid., p. 277.

concentrate an overwhelming attack upon any group of insects which becomes suddenly superabundant. It is evidently impossible, however, that this *reserve* of predaceous species should be maintained unless they could be supported, at least in part, upon food derived from other sources than the bodies of living animals."

NOTES ON PAPILIO<sup>1</sup> PHILENOR.—In the *Canadian Entomologist* for January, 1881, Mr. W. H. Edwards, of Coalburgh, W. Va., describes in full the egg and earlier stages of this interesting butterfly. Mr. Edwards remarks that the larva must undoubtedly feed upon some other plant than *Aristolochia*, since Mr. Mead found the female ovipositing on the leaves of a slender vine some years ago near Coalburg. In 1873 we made notes and descriptions of the egg and larval stages of this insect as found around St. Louis, where *Aristolochia serpentaria* and *A. sipho* are very

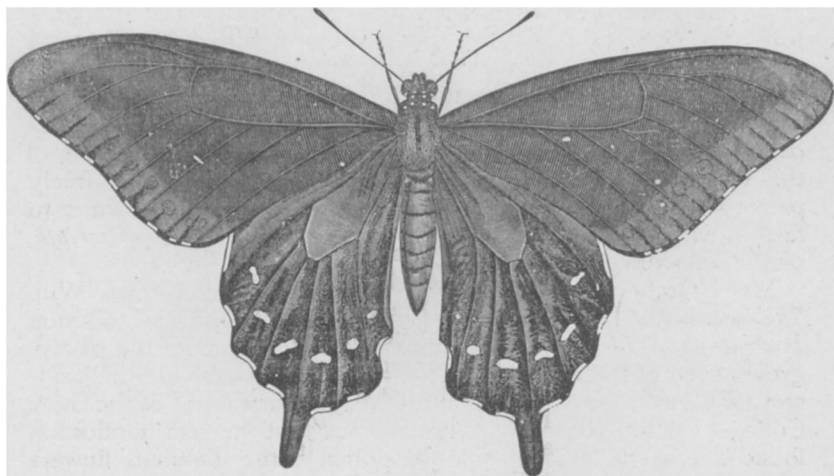


FIG. 1.—*Papilio philenor* (after Riley).

rare, and where the commoner species in the woods upon which the larva feeds is *A. tomentosa*. This species is so unlike the others that a non-botanist would scarcely, at first, suppose it to belong to the same genus, and it is probably the vine referred to by Mr. Edwards, and which he neglected to determine. As bearing on the generic value of Hübner's *Laërtias*, the early stages of *Philenor* are very interesting, approaching as it does *Ornithoptera*. The eggs show really no difference in sculpture from those of the other N. A. *Papilios*, the great difference in appearance being caused by a gummy coating. We found them during the month of July, on *Aristolochia tomentosa*, in patches of 16–20,

<sup>1</sup> *Laërtias* Hüb., as proposed by Scudder.

sometimes laid on the stem, sometimes on the upper side of the leaf, and we repeat here the brief description then made :

Sub-spherical, having a flattened base. Diameter 1 mm. The surface perfectly smooth and, when fresh, the color yellowish; but as the embryo develops, the color deepens to reddish-brown. The general color, however, more or less ferruginous, owing to the surface being coated with a gummy substance of this color, which accumulates in little translucent lumps more or less irregular, but generally showing about a dozen rib-like series from the crown. Spines of the embryo as it matures visible through the shell. Shell so delicate that it collapses in drying if soaked in alcohol. The viscid covering is dissolved in alcohol or chloroform.

The newly hatched larva strongly recalls some larvæ of *Acronycta* and also the young of *Attacus*. But it

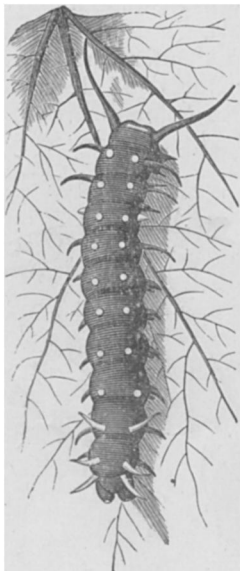


FIG. 2. Larva of *Papilio philenor* (after Riley).

is structurally very similar to the first larval stage of our other North American *Papilio*s, so far as we have observed them, especially of *Asterias*, the tubercles being more pronounced, though it differs from the other species in being at first gregarious. This last difference in habit can, however, have no generic value whatever, as we find similar exceptions in other genera, *e. g.*, *Apatura herse* and *Sphinx catalpæ*, in which the eggs are laid in masses and the young are gregarious, though in the other species of either genus, the eggs are laid singly and the larvæ are solitary. Harris<sup>1</sup> gives an excellent account of the newly hatched larva, which he likens to the (presumably full grown) larva of *Ornithoptera*, and after giving an account of the larval changes, and of the pupa, expresses the opinion that the species is a connecting one between *Papilio* and *Ornithoptera*. The butterfly appears very early in the spring, and we have even known it to issue in mild weather in November at St. Louis. We further quote from our notes in regard to the newly-hatched larva :

Length 2.3 mm. Ferruginous-brown, the head and legs black. Eight rows of small, black, conical tubercles, each bearing a stiff black hair as long as or longer than the diameter of the body; four of the tubercles dorsal, and trapezoidal on all joints but second and third, the trapezoid reversed (*i. e.*, the anterior pair of tubercles wider apart than the posterior pair) on the black and polished cervical shield. There is, besides, a subventral and a ventral row of less conspicuous tubercles, generally concolorous with body and most prominent on the legless joints. On the second or third day the outer row of dorsal tubercles increase in size and become paler at base, and this is especially the case on prothoracic joint.

Mr. Edwards describes in detail the larval changes, and shows that there are only four molts instead of five, as he formerly supposed, which accords with our own notes. We gave some

<sup>1</sup> Correspondence, edited by S. H. Scudder, pp. 147, 273.

Harris's Companion, p. 247.



account of the insect in 1869,<sup>1</sup> from which the accompanying figures are taken.

Mr. Scudder communicated to us some years ago an interesting fact in reference to this species. It appears that the caterpillar, in 1840, ravaged the *Aristolochias* in the Botanic Garden at Cambridge,<sup>2</sup> and had never afterwards been seen in that vicinity until some plants of *Aristolochia* were taken from the Botanic Garden to Beverly, a few miles distant, when caterpillars appeared, in 1876, on the Beverly plants. Dr. Hagen recently notes their reappearance at Cambridge, presumably last year, as early as June.<sup>3</sup>

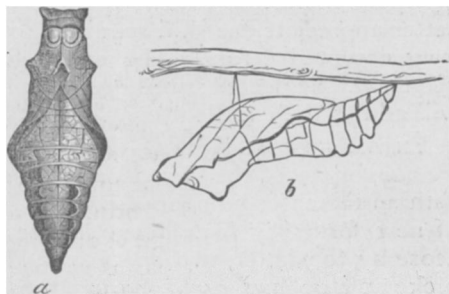


FIG. 3.—Chrysalis of *Papilio philenor* (after Riley).

We do not know of any records of this butterfly swarming, as several other species are known to do, but the following letter accompanied by specimens, addressed to us by the Rev. C. P. B. Martin, of Huntsville, Texas, March 5, 1874, shows that this species, too, may and does, in the Southern States, congregate in such swarms.

"I send you herein enclosed a butterfly, and though it is by no means a *rare* one, yet from the multitudinous swarms of it now flying about and literally *filling* the peach trees now in full bloom, I wish to know something more about it. I never saw so many butterflies of any one kind as there now are of this. The little yellow fellows that are seen in the summer around 'mud puddles' in the road, are few in comparison."—C. V. Riley.

**ANATOMY OF THE MILKWEED BUTTERFLY.**—Mr. Edward Burgess has lately published a paper on the structure of *Danaïs archippus*, which describes the anatomy of that butterfly with rare accuracy and clearness. Students of insect anatomy will especially appreciate this memoir, contained in the anniversary volume of the Boston Society of Natural History. It is one of the best entomological articles yet published, and makes us look forward eagerly to the appearance of other monographs upon other species of insects, which Mr. Burgess is understood to be engaged upon. The general figure (Pl. 1, Fig. 2) of the anatomy of *Danaïs* is particularly good, and ought to be copied into the text books. The author has elucidated many points, erroneously described or entirely overlooked by earlier writers. To him we owe the important discovery of a pharynx, or true sucking

<sup>1</sup> 2d Rep. Ins. Mo., pp. 116-118.

<sup>2</sup> See also Harris, *loc. cit.*, p. 147.

*Can. Ent.*, Feb., 1881, p. 37.

stomach in the head, and of the extraordinary course of the aorta in the thorax, and the elucidation of the very complicated arrangement of the sexual organs. Even the gifted dissector, Newport, blundered badly in these matters. We can, therefore, better appreciate the skill requisite to avoid a repetition of these long accepted errors. The whole field of insect anatomy has been much neglected; we hope, therefore, that other investigators will add to the excellent contributions of Mr. Burgess.—C. S. M.

ENTOMOLOGICAL NOTES.—The second number of the new journal *Papilio*, organ of the New York Entomological Club, comes to us with an increased number of pages. There are many descriptions of new forms by Mr. Henry Edwards and Mr. Grote; among those by the latter, two species of Phycidæ injuriously affecting hickory, *Acrobasis caryæ* boring the twigs of *Carya porcina* and *Ac. angusella* boring the leaf-stem, presumably of the same species. If our memory serves us right, Edwardsia, the new generic name proposed by Mr. Neumœgen for the beautiful moth figured on the plate in the first number, is preoccupied for a genus of Actinozoa; and the name Oribates, proposed by Mr. Henry Edwards, in the second number, for a genus of small moths is preoccupied among the mites (Acarina).—In the Proceedings of the Boston Society of Natural History for January, 1880, Dr. Hagen describes a remarkably large species of Simulium (*S. pictipes*, n. sp.), the larvæ and pupæ of which were found in the rapids of the Au Sable river, Adirondack mountains. We have the larvæ and pupæ of what is presumably the same species, found by Messrs. Hubbard and Schwarz, in the rapids of the Michipicoten river, north shore of Lake Superior, and it is probable that this is the celebrated "black-fly" of that region. In the rapids of the Michipicoten the larvæ were found to have the peculiarity of floating in long single strings attached to each other by silken threads and the pupæ found in the quieter pools close by, resemble clusters of coral. Mr. Schwarz informs us that the Hudson Bay Company has furnished its employés with oil of tar as a protection against these flies, and he confirms from his own experience the fact that it is much better than pennyroyal or any other substance recommended for the purpose.—We learn from Mr. H. K. Morrison, of Morganton, N. C., that, after much delay, he has just received the insects collected by him last summer in California and Washington Territory.—At a recent meeting at Rochester, of the Western New York Horticultural Society, papers on insects affecting horticulture were read by Messrs. C. D. Zimmerman and Wm. Saunders.—Two bills have been presented before the California Legislature aiming to protect the careful farmer from insect pests bred upon the lands of shiftless neighbors.—Mr. Wm. B. Lazenby finds whale-oil soap the best specific for destroying cabbage-worms, and treats of other insecticides in the *American Rural Home* of February, 19th.

He has probably not tried our favorite remedy, Pyrethrum water. — The *Pacific Rural Press* cites some successful experiments made by Mr. W. H. Gilmore, in the use of crude petroleum for destroying the scale insects on the bark of fruit trees. — Mr. A. E. Hodgson gives in the *Entomologists' Monthly Magazine* for February, a remarkable instance of vitality exhibited by the rhynchophorous genus *Otiorhynchus*, some specimens of *O. ambiguus* surviving after being left for over eight months in a poison bottle, consisting of a stopped glass jar with fresh laurel leaves which kill most insects in a few minutes. It is well known that other species of this genus have been kept in spirits of turpentine, in alcohol and in the cyanide bottle for days without being killed. — Dr. Theobald at a recent meeting of the Maryland Academy of Sciences, showed a beetle weighing two grains which moved 1320 times its own weight. — Dr. Horn publishes in the proceedings of the American Philosophical Society, a review of the species of *Anisodactylus*, and critical notes on the species of *Selenophorus*, giving synopses of all the species of these genera of ground-beetles found in the United States. — In the latest part of the *Stettiner Entomologische Zeitung* is a short article on the larvæ of Parnidæ, by C. W. Friedenreich of Blumenau, Brazil. — Mr. A. D. Michael has read before the Linnean Society, an interesting paper on the life-history of the Gamasidæ, a family of mites which are very common parasites of beetles. — Professor T. J. Burrill writes in the *New York Tribune*, February 16th, regarding two cases in which plant-lice were found to be offensive in wells penetrated by roots of willow trees near Champaign, Ill. — In *Nature* for January 13, is an abstract of a paper read before the Linnean Society by Sir John Lubbock, relating to the habits of ants. An account is given of the care with which the ants keep in their nests over winter the eggs of plant-lice.

#### ANTHROPOLOGY.<sup>1</sup>

ANTHROPOLOGY IN FRANCE. — In connection with the Exposition at Paris in 1878, was held the "Congrès International des sciences anthropologiques." The superb collections of specimens illustrating every department of anthropology added very much to the interest and value of the papers read. These communications have now been collected and published in a volume bearing the name of the Congrès. Their titles will be found below :

D'Acy (E.). — Notes sur les patines des silex taillés des alluvions de Saint-Acheul, et sur l'ordre de leur superpositions, 234-237.

Ameghino, F. — L'homme préhistorique dans le bassin de la Plata, 341-350.

Bataillard, P. — Historique et préliminaires de la question de l'importation du bronze dans le nord et l'occident de l'Europe par les Tsiganes, 153-166.

Beddoe, J. — Sur quelques crânes d'un vieux cimetière de Bristol, 283-285.

Benedikt, M. — Sur les cervaux des Criminels, 141-148.

<sup>1</sup> Edited by Prof. ORIS T. MASON, Columbian College, Washington, D. C.